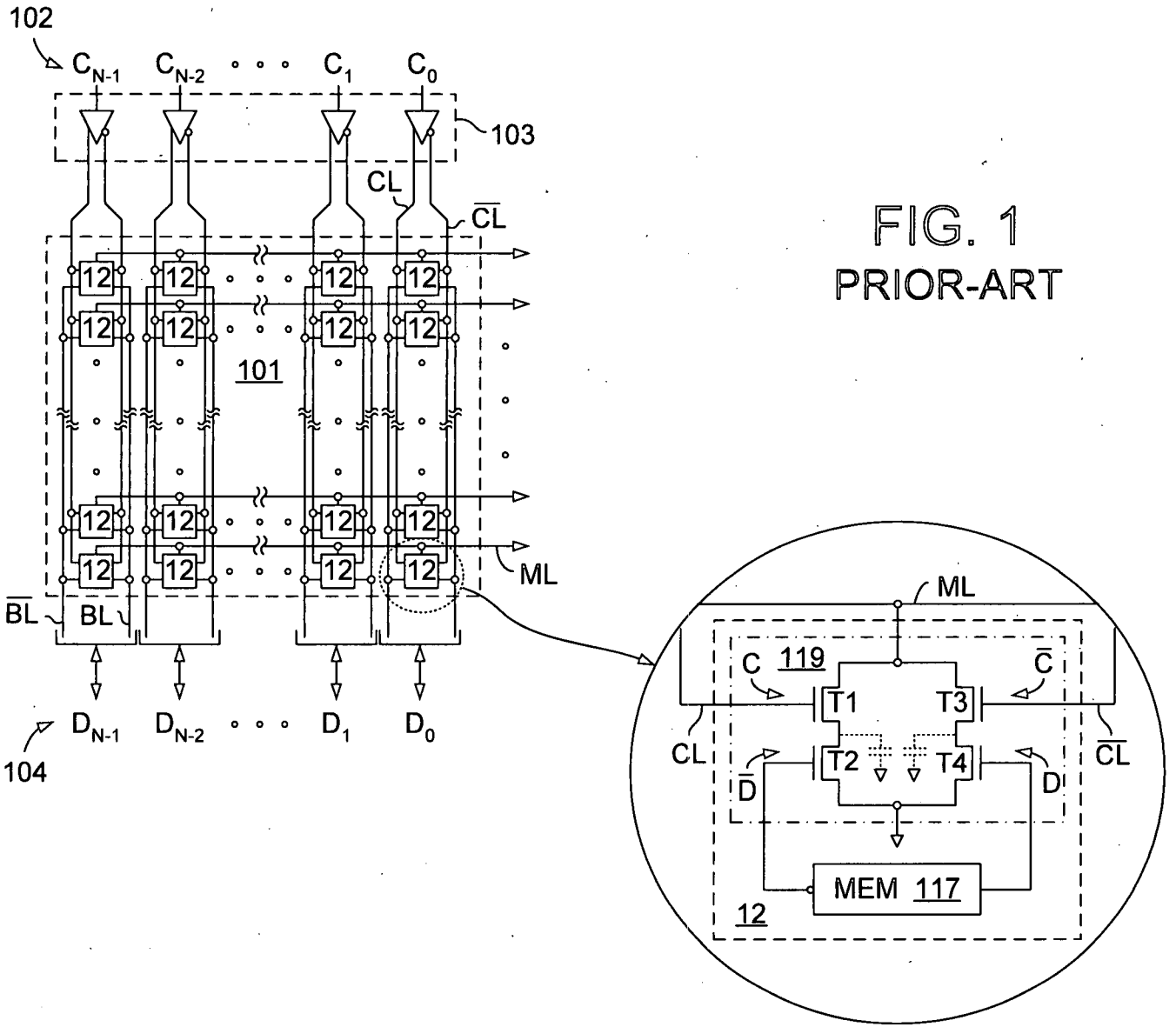


FIG. 1
PRIOR-ART

FIG. 2

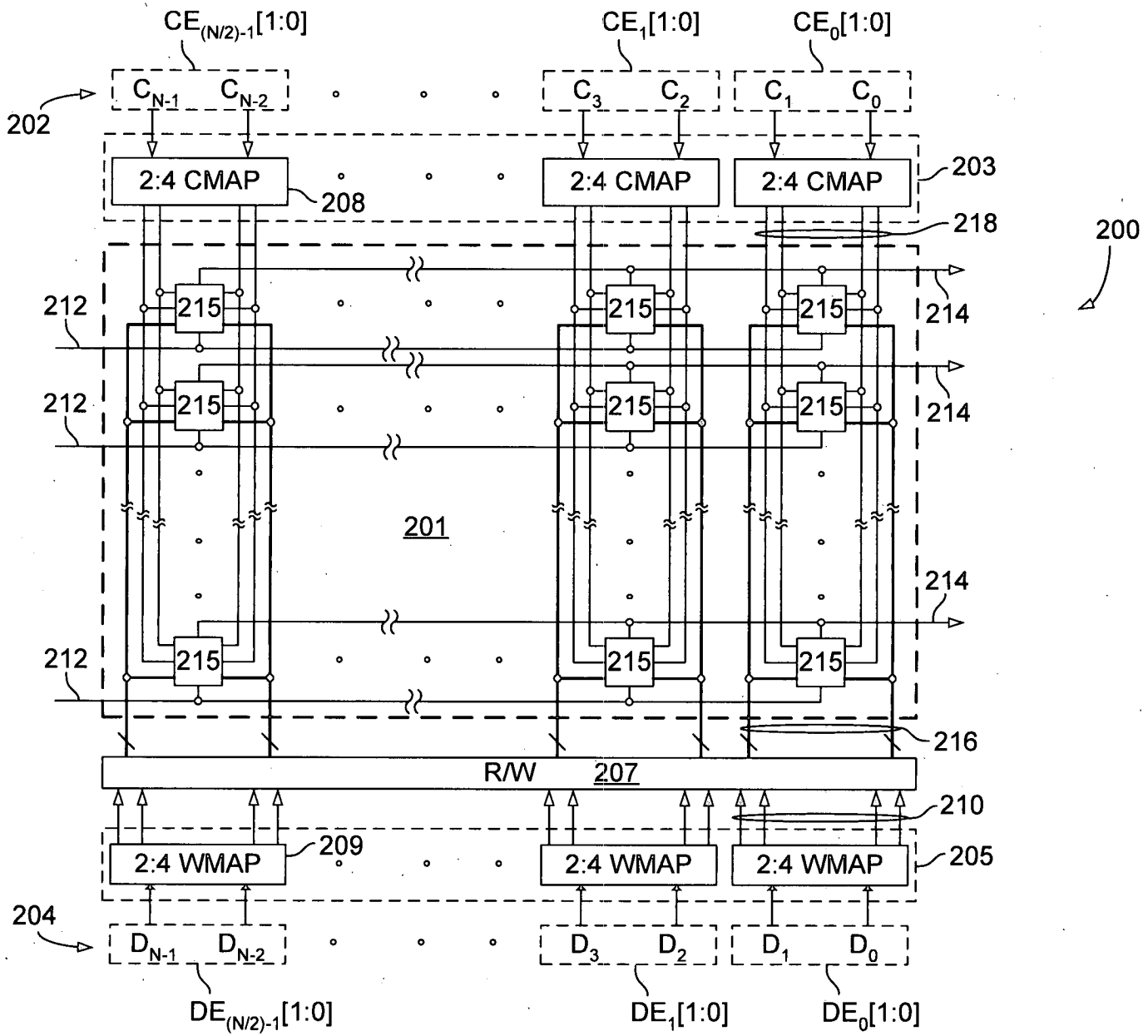
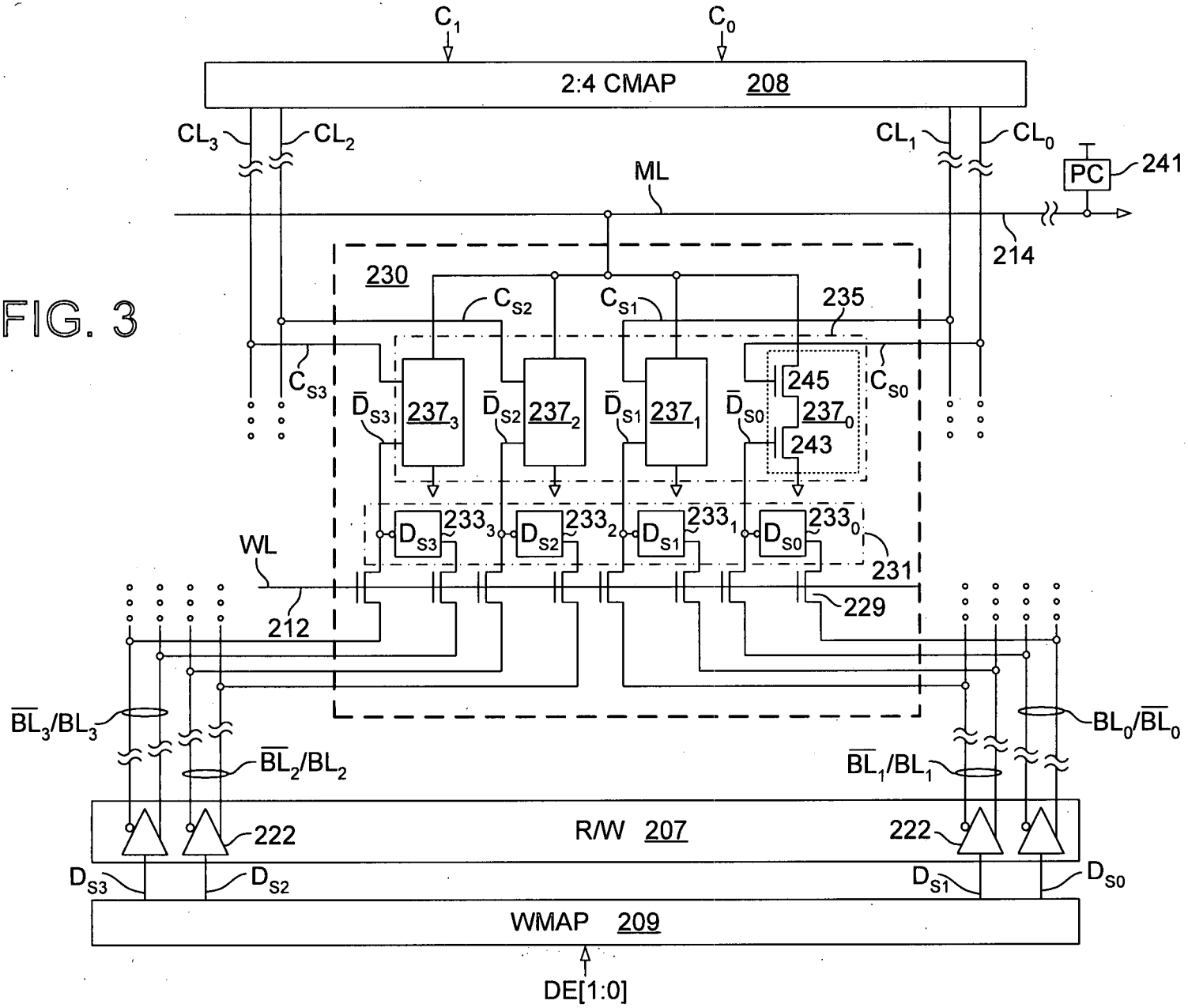

CE(N/2)-1[1:0]
CE1[1:0]
CE0[1:0]
202
CN-1 CN-2
C3 C2
C1 C0
2:4 CMAP
208
203
218
200
212
215
214
201
216
R/W 207
210
2:4 WMAP
209
205
204
DN-1 DN-2
D3 D2
D1 D0
DE(N/2)-1[1:0]
DE1[1:0]
DE0[1:0]

FIG. 3


C1
C0
2:4 CMAP 208
CL3
CL2
CL1
CL0
PC
241
ML
214
230
CS2
CS1
235
CS3
CS0
D̄S3
2373
D̄S2
2372
D̄S1
2371
D̄S0
245
2370
243
DS3
2333
DS2
2332
DS1
2331
DS0
2330
231
WL
212
229
BL3/BL3
BL2/BL2
BL1/BL1
BL0/BL0
222
R/W 207
222
DS3
DS2
DS1
DS0
WMAP 209
DE[1:0]

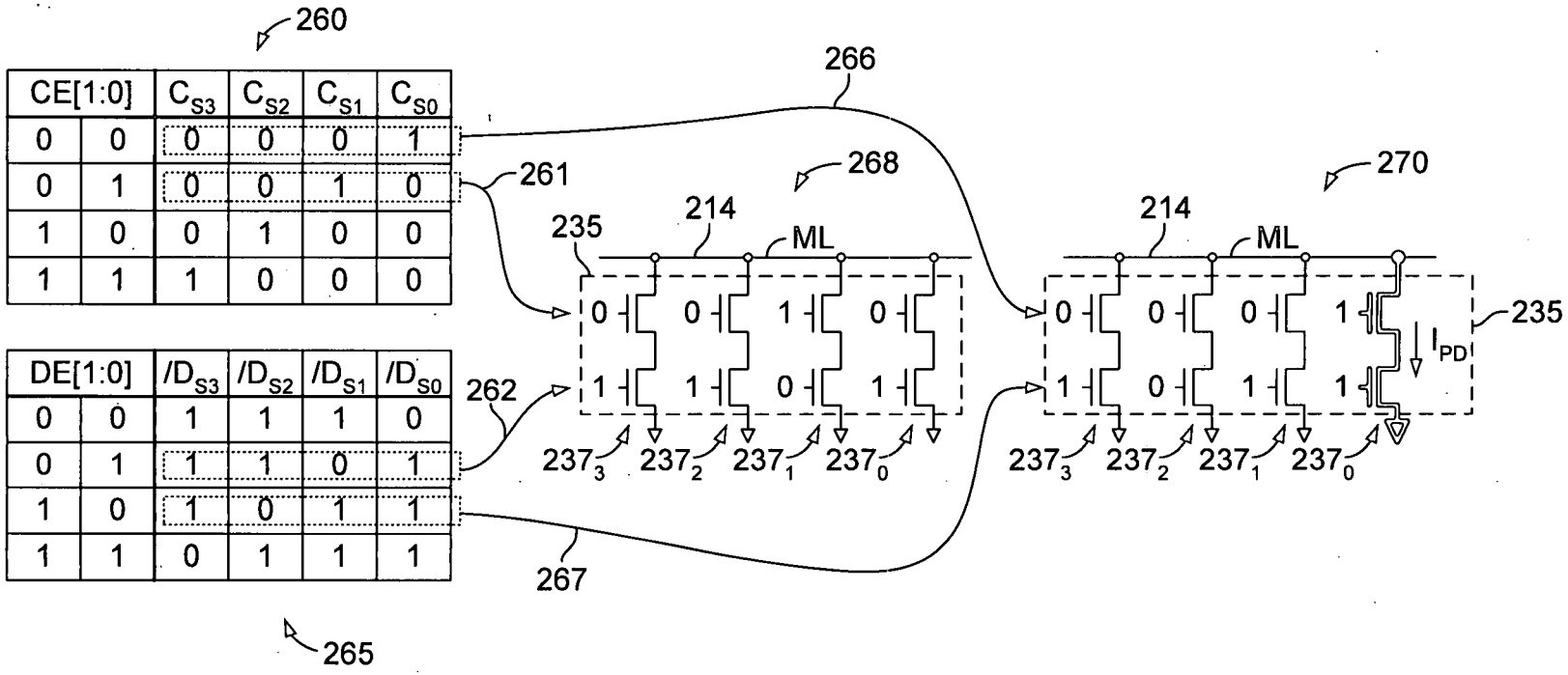

260
CE[1:0]
C_{S3} C_{S2} C_{S1} C_{S0}
0 0 0 0 0 1
0 1 0 0 1 0
1 0 0 1 0 0
1 1 1 0 0 0
DE[1:0]
$/D_{S3}$ $/D_{S2}$ $/D_{S1}$ $/D_{S0}$
0 0 1 1 1 0
0 1 1 1 0 1
1 0 1 0 1 1
1 1 0 1 1 1
265
261
262
266
267
268
270
235
214
ML
237_3 237_2 237_1 237_0
I_{PD}

FIG. 4

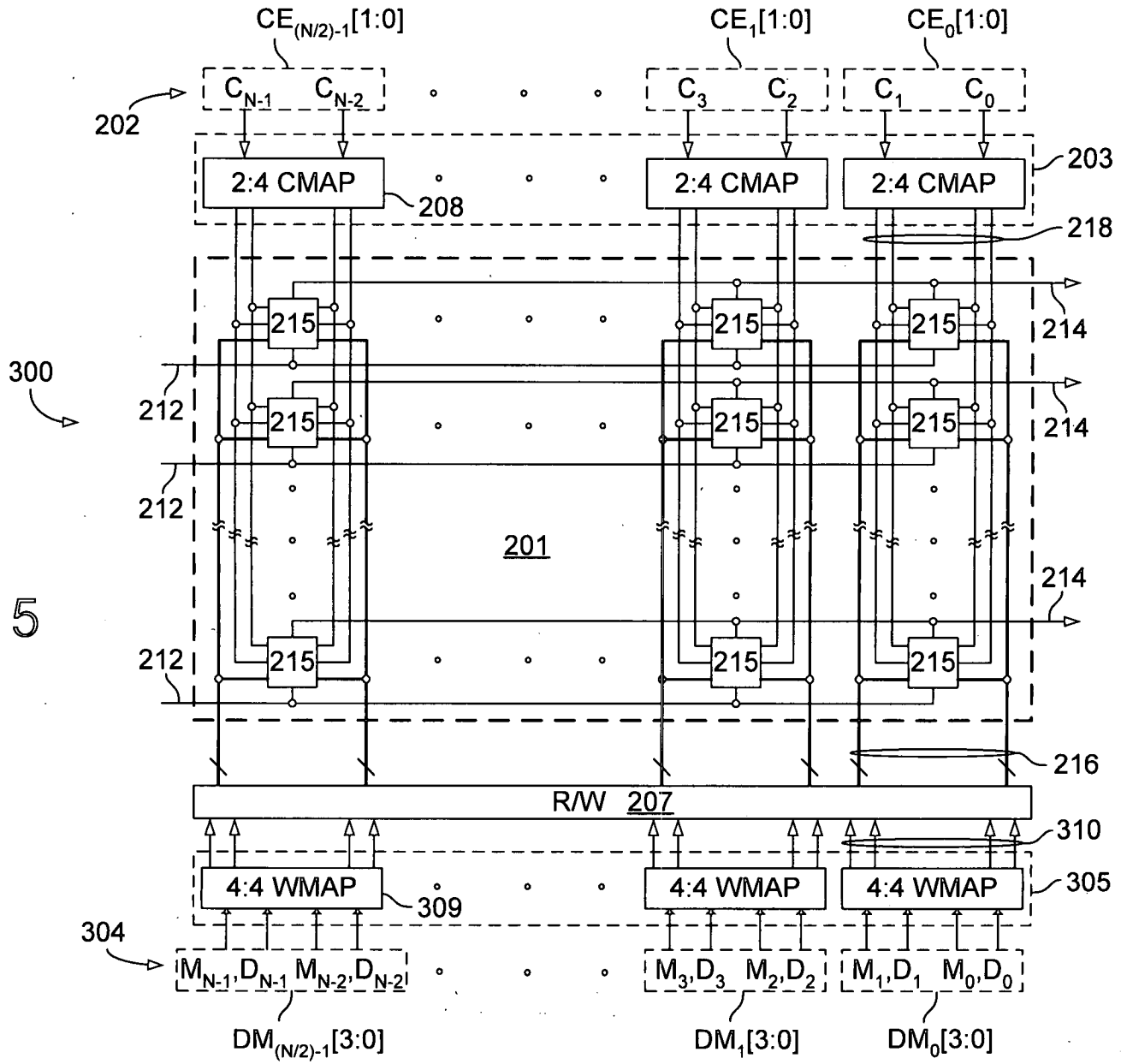

CE(N/2)-1[1:0]
CE1[1:0]
CE0[1:0]
CN-1 CN-2
C3 C2
C1 C0
202
203
2:4 CMAP
208
218
215
214
300
212
201
216
R/W 207
310
4:4 WMAP
309
305
304
MN-1,DN-1 MN-2,DN-2
M3,D3 M2,D2
M1,D1 M0,D0
DM(N/2)-1[3:0]
DM1[3:0]
DM0[3:0]

FIG. 5

FIG. 6

Row	DM[3:0] M_1	D_1	M_0	D_0	D_{EQ}	Represented Data States:	Data Map D_{S3}	D_{S2}	D_{S1}	D_{S0}	CE[1:0]=11 C_{S3-S0}=1000	CE[1:0]=10 C_{S3-S0}=0100	CE[1:0]=01 C_{S3-S0}=0010	CE[1:0]=00 C_{S3-S0}=0001
1	0	0	0	0	00	S0	0	0	0	1	F	F	F	M
2	0	0	0	1	01	S1	0	0	1	0	F	F	M	F
3	0	0	1	0	0X	S0, S1	0	0	1	1	F	F	M	M
4	0	0	1	1	0X	S0, S1	0	0	1	1	F	F	M	M
5	0	1	0	0	10	S2	0	1	0	0	F	M	F	F
6	0	1	0	1	11	S3	1	0	0	0	M	F	F	F
7	0	1	1	0	1X	S2, S3	1	1	0	0	M	M	F	F
8	0	1	1	1	1X	S2, S3	1	1	0	0	M	M	F	F
9	1	0	0	0	X0	S0, S2	0	1	0	1	F	M	F	M
10	1	0	0	1	X1	S1, S3	1	0	1	0	M	F	M	F
11	1	0	1	0	XX	S0, S1, S2, S3	1	1	1	1	M	M	M	M
12	1	0	1	1	XX	S0, S1, S2, S3	1	1	1	1	M	M	M	M
13	1	1	0	0	X0	S0, S2	0	1	0	1	F	M	F	M
14	1	1	0	1	X1	S1, S3	1	0	1	0	M	F	M	F
15	1	1	1	0	XX	S0, S1, S2, S3	1	1	1	1	M	M	M	M
16	1	1	1	1	XX	S0, S1, S2, S3	1	1	1	1	M	M	M	M

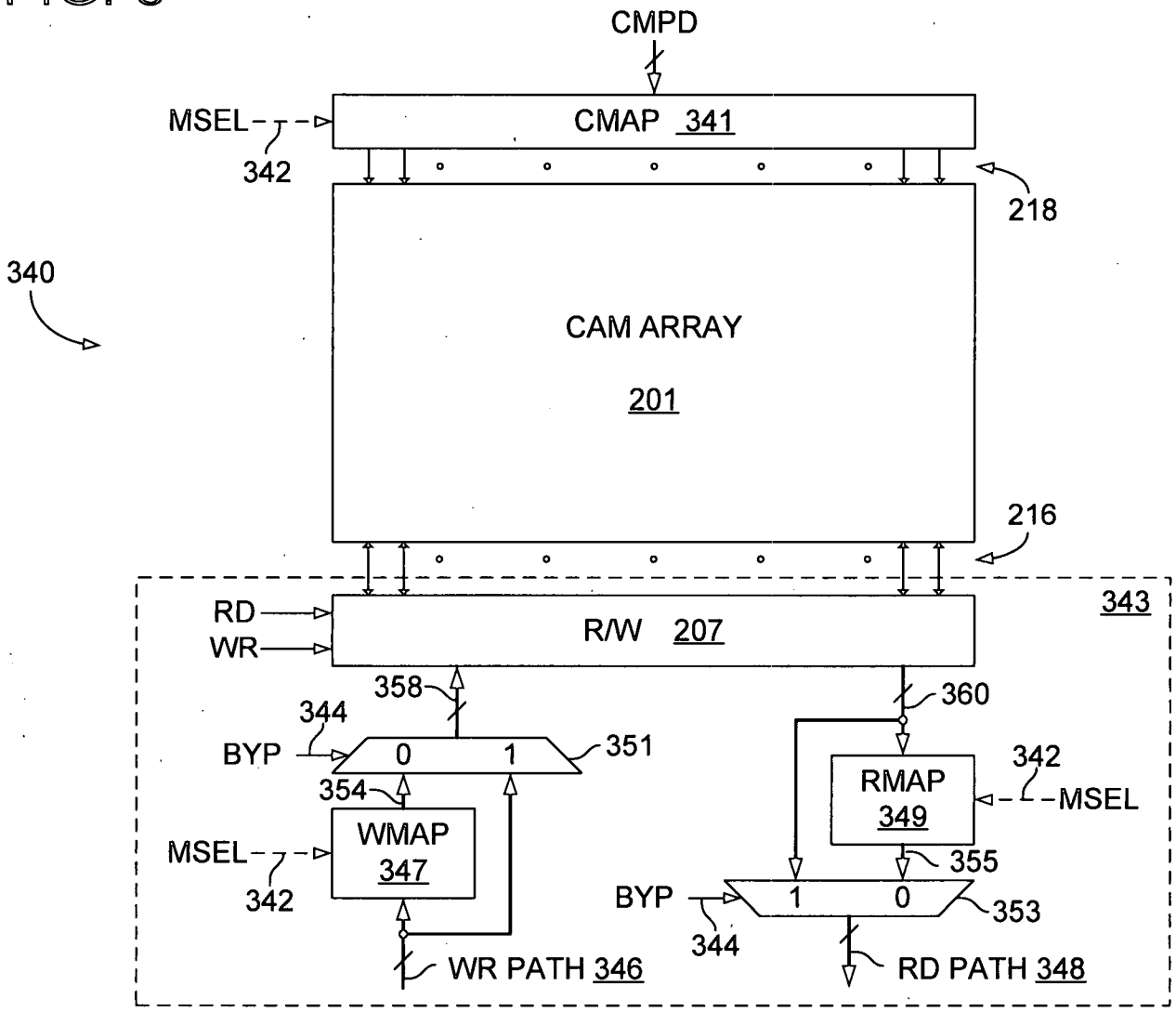
320

FIG. 7

Row	DM[3:0] M_1	D_1	M_0	D_0	D_{EQ}	Represented Data States:	Data Map D_{S3}	D_{S2}	D_{S1}	D_{S0}	CE[1:0]=11 C_{S3-S0}=1000	CE[1:0]=10 C_{S3-S0}=0100	CE[1:0]=01 C_{S3-S0}=0010	CE[1:0]=00 C_{S3-S0}=0001
1	0	0	0	0	00	S0	0	0	0	1	F	F	F	M
2	0	0	0	1	01	S1	0	0	1	0	F	F	M	F
3	0	0	1	X	0X	S0, S1	0	0	1	1	F	F	M	M
4	0	1	0	0	10	S2	0	1	0	0	F	M	F	F
5	0	1	0	1	11	S3	1	0	0	0	M	F	F	F
6	0	1	1	X	1X	S2, S3	1	1	0	0	M	M	F	F
7	1	X	0	0	X0	S0, S2	0	1	0	1	F	M	F	M
8	1	X	0	1	X1	S1, S3	1	0	1	0	M	F	M	F
9	1	X	1	X	XX	S0, S1, S2, S3	1	1	1	1	M	M	M	M

330

FIG. 8


CMPD
MSEL
342
CMAP 341
218
340
CAM ARRAY
201
216
343
RD
WR
R/W 207
358
360
344
BYP
0
1
351
354
342
MSEL
RMAP
349
MSEL
WMAP
347
355
BYP
1
0
353
344
342
WR PATH 346
RD PATH 348

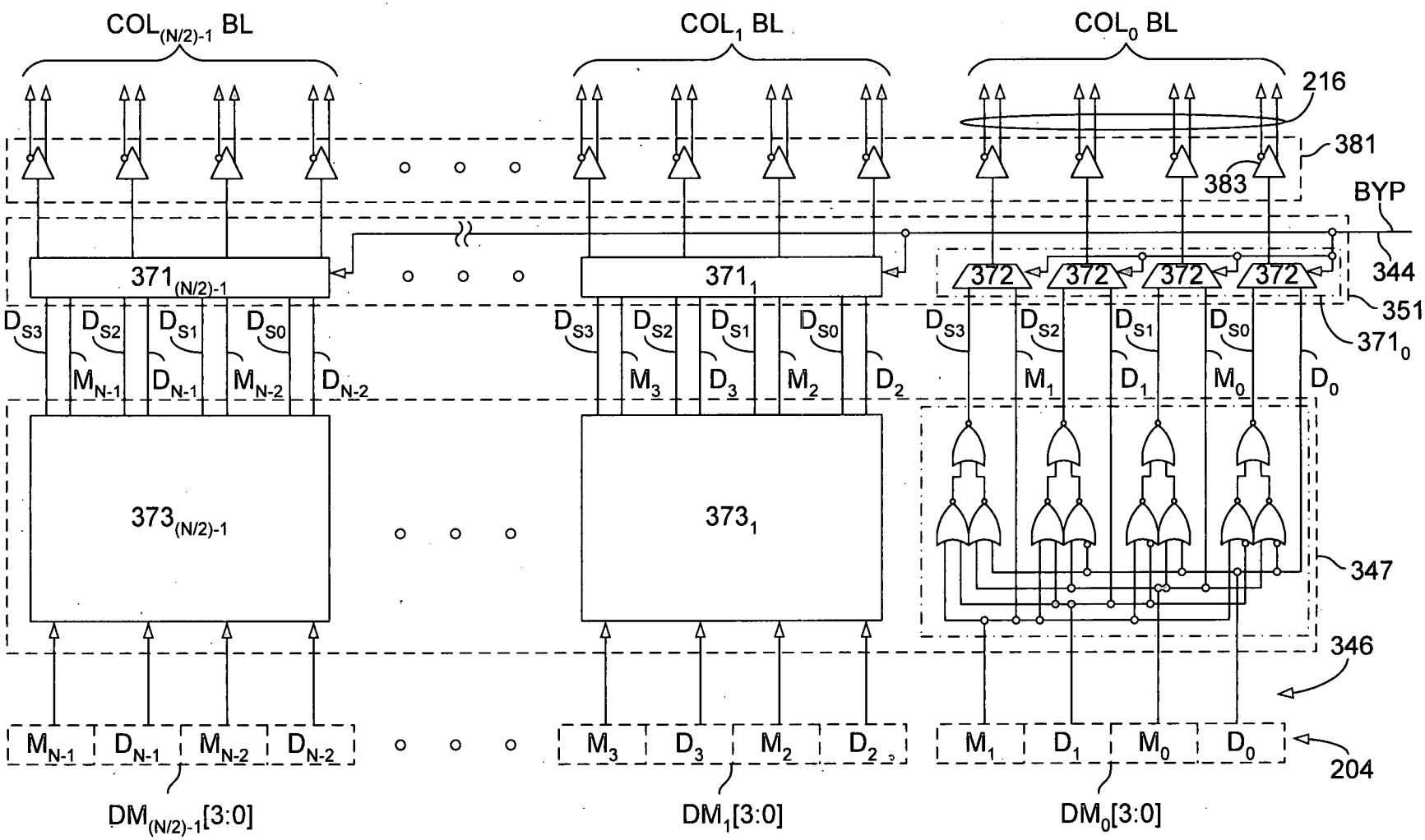

COL(N/2)-1 BL
COL1 BL
COL0 BL
216
381
383
BYP
344
351
3710
372
372
372
372
3710
371(N/2)-1
3711
DS3
DS2
DS1
DS0
MN-1
DN-1
MN-2
DN-2
M3
D3
M2
D2
M1
D1
M0
D0
3730
373(N/2)-1
3731
347
346
204
DM(N/2)-1[3:0]
DM1[3:0]
DM0[3:0]

FIG. 9

Row	Stored Data				Read Data				
	D_{S3}	D_{S2}	D_{S1}	D_{S0}	M_1	D_1	M_0	D_0	D_{EQ}
1	0	0	0	1	0	0	0	0	00
2	0	0	1	0	0	0	0	1	01
3	0	1	0	0	0	1	0	0	10
4	1	0	0	0	0	1	0	1	11
5	0	0	1	1	0	0	1	0	0X
6	1	1	0	0	0	1	1	0	1X
7	0	1	0	1	1	0	0	0	X0
8	1	0	1	0	1	0	0	1	X1
9	1	1	1	1	1	0	1	0	XX

400

FIG. 10

FIG. 11

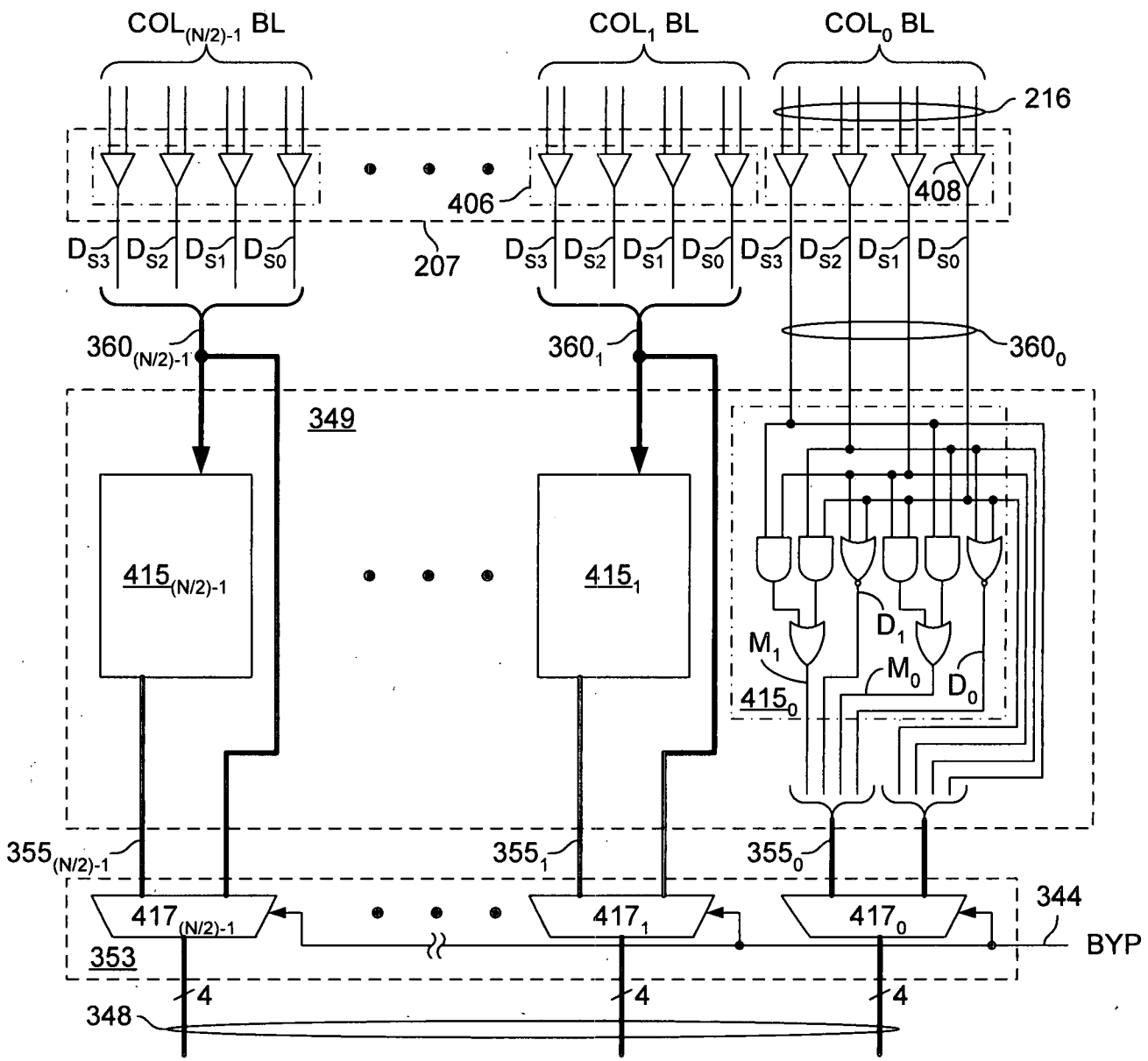

COL(N/2)-1 BL
COL1 BL
COL0 BL
216
406
408
207
DS3 DS2 DS1 DS0
360(N/2)-1
3601
3600
349
4150(N/2)-1
4151
D1
M1
M0
D0
4150
3550(N/2)-1
3551
3550
344
4170(N/2)-1
4171
4170
BYP
353
4
348

FIG. 12

450

MSEL	DM[3:0]					Mapped Data				CE[1:0]=11		CE[1:0]=10		CE[1:0]=01		CE[1:0]=00	
0=SM,1=XY	M_1	D_1	M_0	D_0	D_{EQ}	D_{S3}/Y_1	D_{S2}/X_1	D_{S1}/Y_0	D_{S0}/X_0	CDEC	RES	CDEC	RES	CDEC	RES	CDEC	RES
0	0	0	0	0	00	0	0	0	1	1000	F	0100	F	0010	F	0001	M
0	0	0	0	1	01	0	0	1	0	1000	F	0100	F	0010	M	0001	F
0	0	0	1	X	0X	0	0	1	1	1000	F	0100	F	0010	M	0001	M
0	0	1	0	0	10	0	1	0	0	1000	F	0100	M	0010	F	0001	F
0	0	1	0	1	11	1	0	0	0	1000	M	0100	F	0010	F	0001	F
0	0	1	1	X	1X	1	1	0	0	1000	M	0100	M	0010	F	0001	F
0	1	X	0	0	X0	0	1	0	1	1000	F	0100	M	0010	F	0001	M
0	1	X	0	1	X1	1	0	1	0	1000	M	0100	F	0010	M	0001	F
0	1	X	1	X	XX	1	1	1	1	1000	M	0100	M	0010	M	0001	M
1	0	0	0	0	00	1	0	1	0	0101	F	0110	F	1001	F	1010	M
1	0	0	0	1	01	1	0	0	1	0101	F	0110	F	1001	M	1010	F
1	0	0	1	X	0X	1	0	0	0	0101	F	0110	F	1001	M	1010	M
1	0	1	0	0	10	0	1	1	0	0101	F	0110	M	1001	F	1010	F
1	0	1	0	1	11	0	1	0	1	0101	M	0110	F	1001	F	1010	F
1	0	1	1	X	1X	0	1	0	0	0101	M	0110	M	1001	F	1010	F
1	1	X	0	0	X0	0	0	1	0	0101	F	0110	M	1001	F	1010	M
1	1	X	0	1	X1	0	0	0	1	0101	M	0110	F	1001	M	1010	F
1	1	X	1	X	XX	0	0	0	0	0101	M	0110	M	1001	M	1010	M

FIG. 13

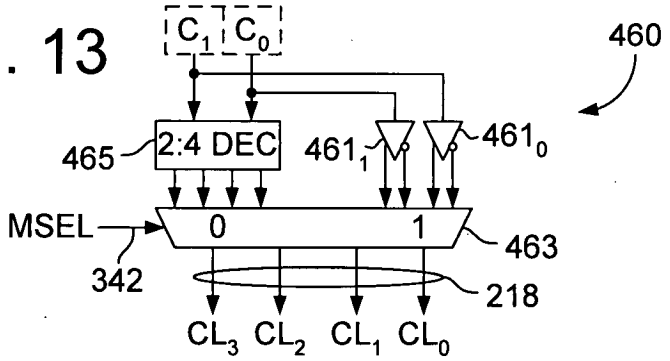

C1 C0
460
465
2:4 DEC
461 1
461 0
MSEL
342
0
1
463
218
CL3 CL2 CL1 CL0

FIG. 14

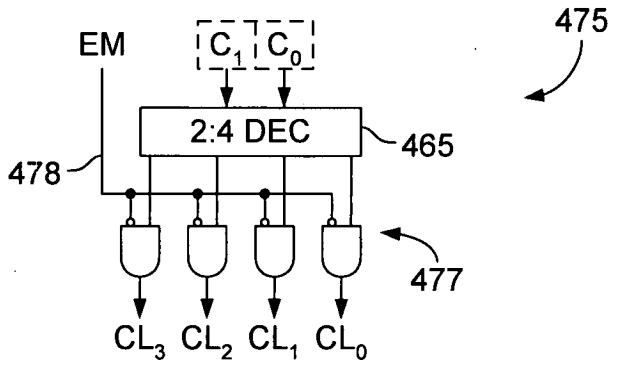

475
EM
C1 C0
2:4 DEC
465
478
477
CL3 CL2 CL1 CL0

FIG. 15

500

	MSEL	Stored Data				Read Data				
Row	0=SM,1=XY	D_{S3}/Y_1	D_{S2}/X_1	D_{S1}/Y_0	D_{S0}/X_0	M_1	D_1	M_0	D_0	D_{EQ}
1	0	0	0	0	1	0	0	0	0	00
2	0	0	0	1	0	0	0	0	1	01
3	0	0	1	0	0	0	1	0	0	10
4	0	1	0	0	0	0	1	0	1	11
5	0	0	0	1	1	0	0	1	0	0X
6	0	1	1	0	0	0	1	1	0	1X
7	0	0	1	0	1	1	0	0	0	X0
8	0	1	0	1	0	1	0	0	1	X1
9	0	1	1	1	1	1	0	1	0	XX
10	1	1	0	1	0	0	0	0	0	00
11	1	1	0	0	1	0	0	0	1	01
12	1	0	1	1	0	0	1	0	0	10
13	1	0	1	0	1	0	1	0	1	11
14	1	1	0	0	0	0	0	1	0	0X
15	1	0	1	0	0	0	1	1	0	1X
16	1	0	0	1	0	1	0	1	0	X0
17	1	0	0	0	1	1	0	0	1	X1
18	1	0	0	0	0	1	0	1	0	XX

FIG. 16

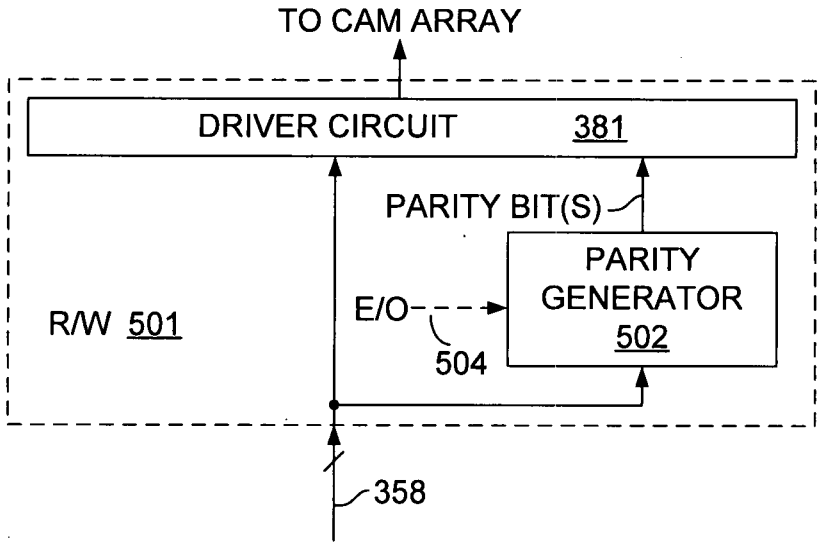


FIG. 17

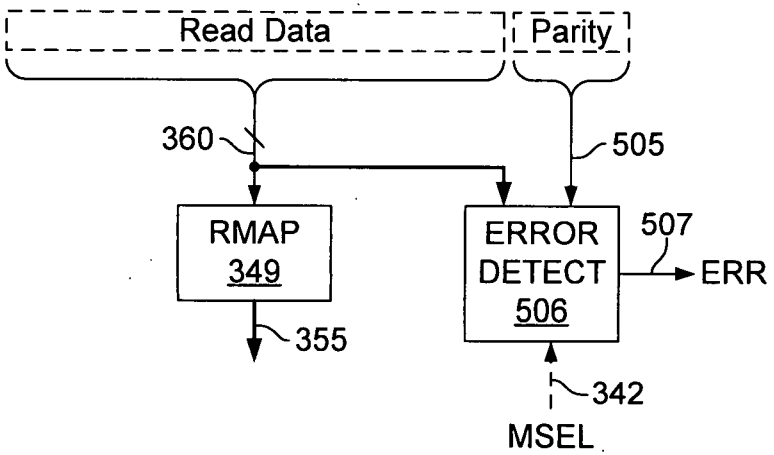


FIG. 18

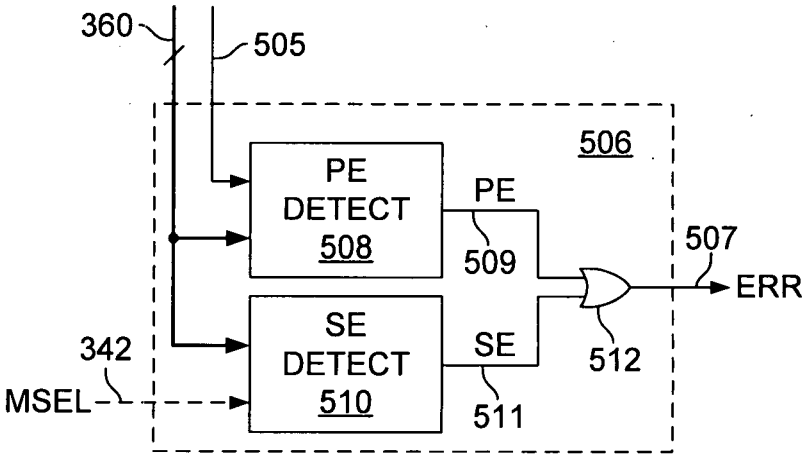


FIG. 19

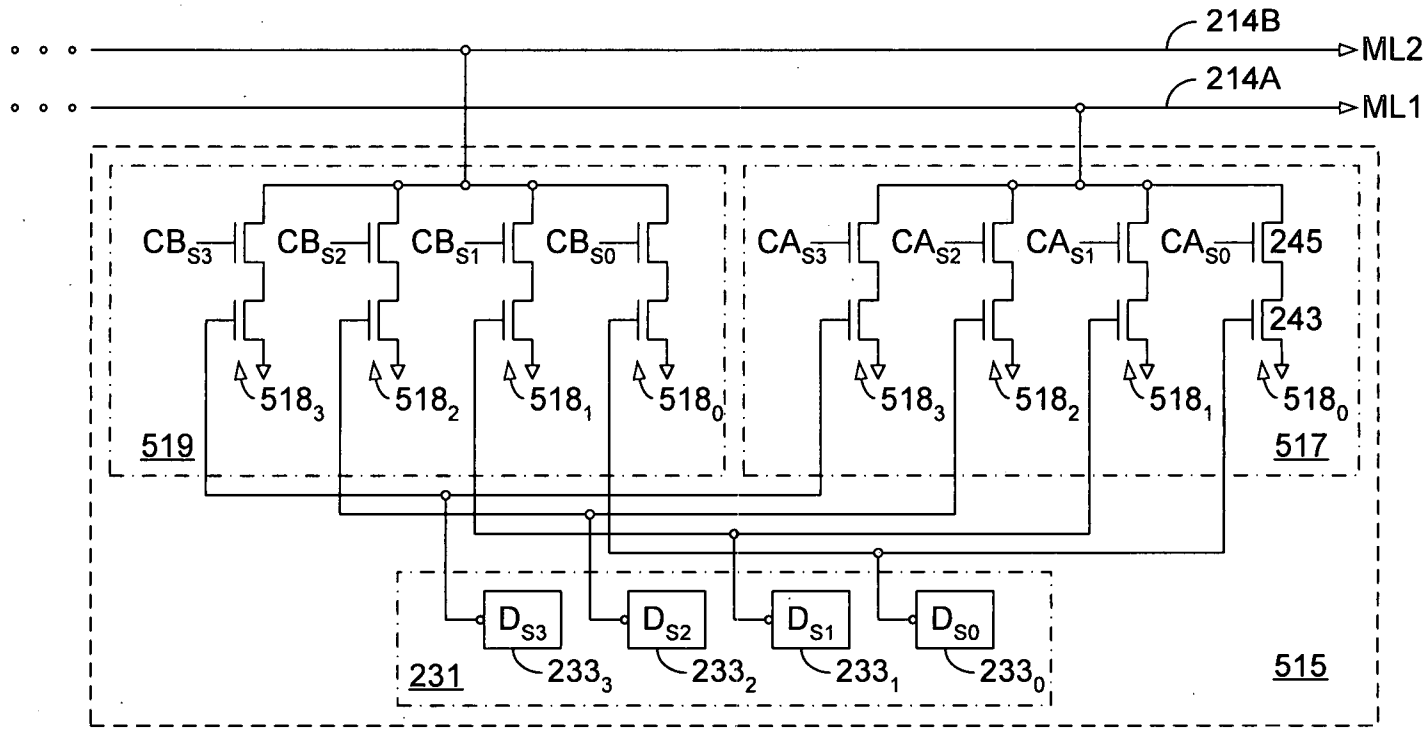


FIG. 20

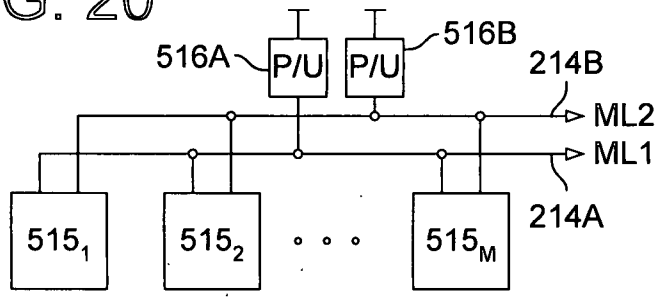


FIG. 21

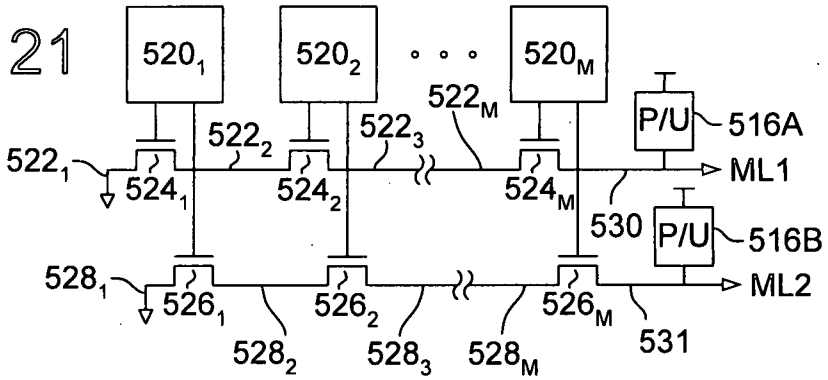


FIG. 22

540

Row	BYP	DE[3:0]					Match on CE or A-B States:	Dec Data State				CE[1:0]=11		CE[1:0]=10		CE[1:0]=01		CE[1:0]=00	
		M_1	D_1	M_0	D_0	D_{EQ}		D_{S3}	D_{S2}	D_{S1}	D_{S0}	CDEC	RES	CDEC	RES	CDEC	RES	CDEC	RES
1	0	0	0	0	0	00	S0	0	0	0	1	1000	F	0100	F	0010	F	0001	M
2	0	0	0	0	1	01	S1	0	0	1	0	1000	F	0100	F	0010	M	0001	F
3	0	0	0	1	X	0X	S0+S1	0	0	1	1	1000	F	0100	F	0010	M	0001	M
4	0	0	1	0	0	10	S2	0	1	0	0	1000	F	0100	M	0010	F	0001	F
5	0	0	1	0	1	11	S3	1	0	0	0	1000	M	0100	F	0010	F	0001	F
6	0	0	1	1	X	1X	S2+S3	1	1	0	0	1000	M	0100	M	0010	F	0001	F
7	0	1	X	0	0	X0	S0+S2	0	1	0	1	1000	F	0100	M	0010	F	0001	M
8	0	1	X	0	1	X1	S1+S3	1	0	1	0	1000	M	0100	F	0010	M	0001	F
9	0	1	X	1	X	XX	S0+S1+S2+S3	1	1	1	1	1000	M	0100	M	0010	M	0001	M
10	1	0	0	0	0	--	FALSE	0	0	0	0	1000	F	0100	F	0010	F	0001	F
11	1	0	0	0	1	--	/A * /B	0	0	0	1	1000	F	0100	F	0010	F	0001	M
12	1	0	0	1	0	--	/A * B	0	0	1	0	1000	F	0100	F	0010	M	0001	F
13	1	0	0	1	1	--	/A	0	0	1	1	1000	F	0100	F	0010	M	0001	M
14	1	0	1	0	0	--	A * /B	0	1	0	0	1000	F	0100	M	0010	F	0001	F
15	1	0	1	0	1	--	/B	0	1	0	1	1000	F	0100	M	0010	F	0001	M
16	1	0	1	1	0	--	A⊕B	0	1	1	0	1000	F	0100	M	0010	M	0001	F
17	1	0	1	1	1	--	/A + /B	0	1	1	1	1000	F	0100	M	0010	M	0001	M
18	1	1	0	0	0	--	A * B	1	0	0	0	1000	M	0100	F	0010	F	0001	F
19	1	1	0	0	1	--	/(A⊕B)	1	0	0	1	1000	M	0100	F	0010	F	0001	M
20	1	1	0	1	0	--	B	1	0	1	0	1000	M	0100	F	0010	M	0001	F
21	1	1	0	1	1	--	/A + B	1	0	1	1	1000	M	0100	F	0010	M	0001	M
22	1	1	1	0	0	--	A	1	1	0	0	1000	M	0100	M	0010	F	0001	F
23	1	1	1	0	1	--	A + /B	1	1	0	1	1000	M	0100	M	0010	F	0001	M
24	1	1	1	1	0	--	A + B	1	1	1	0	1000	M	0100	M	0010	M	0001	F
25	1	1	1	1	1	--	TRUE	1	1	1	1	1000	M	0100	M	0010	M	0001	M

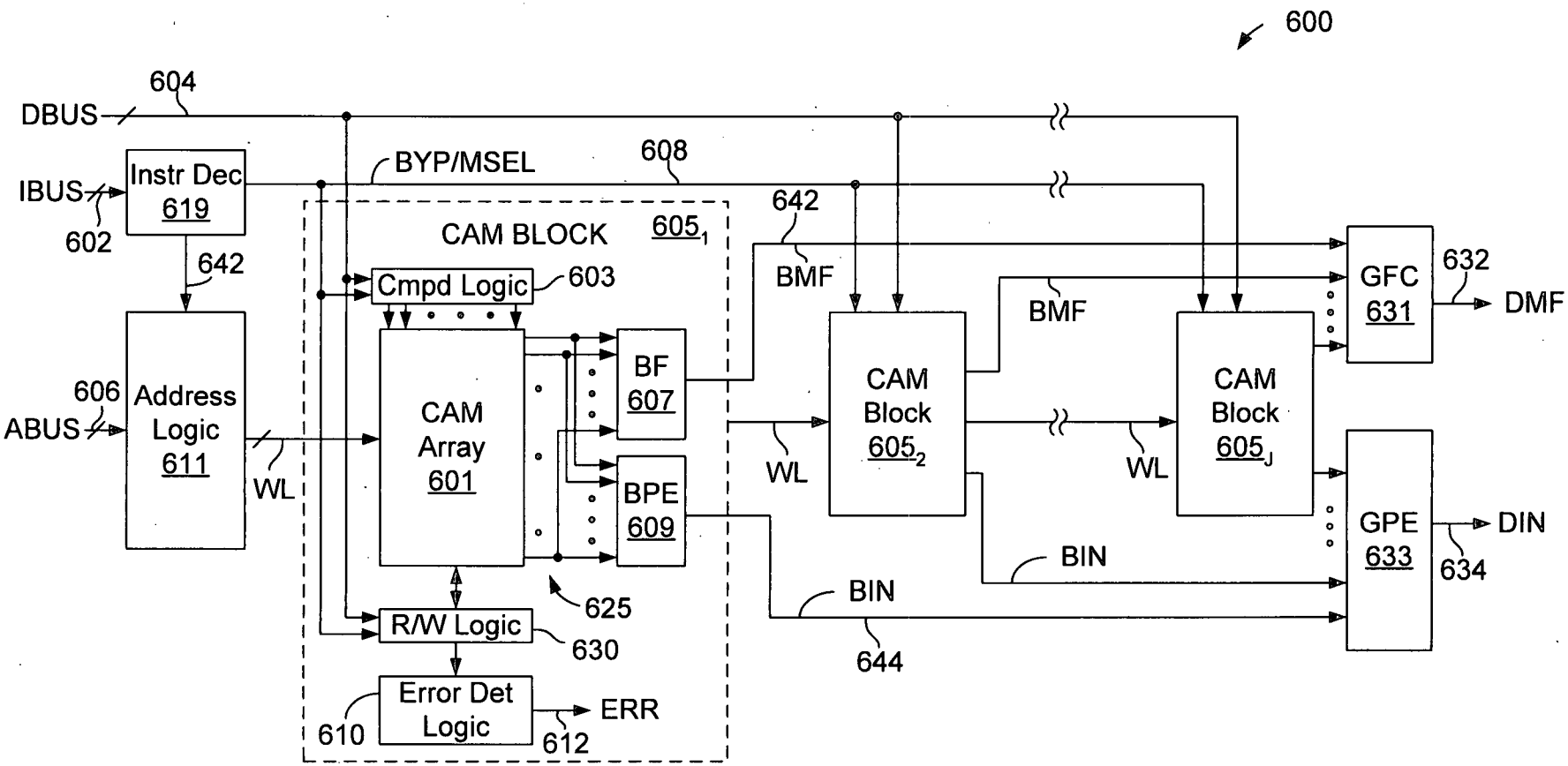

600
604
DBUS
IBUS
602
Instr Dec
619
642
606
ABUS
Address
Logic
611
WL
BYP/MSEL
608
CAM BLOCK
605_1
Cmpd Logic
603
CAM
Array
601
BF
607
BPE
609
625
R/W Logic
630
Error Det
Logic
610
612
ERR
642
BMF
WL
BIN
644
CAM
Block
605_2
BMF
WL
CAM
Block
605_J
BIN
GFC
631
632
DMF
GPE
633
634
DIN

FIG. 23